

I claim:

1. A method of forming a capacitor on a printed circuit board, the method comprising the steps of:

providing a first metal plate on a dielectric substrate, said first metal plate having a first region and a second region,

applying a dielectric layer onto the first region of the conductive metal plate, whereby the second region of the first metal plate is exposed,

depositing a second metal plate onto the dielectric layer and the second region of the first metal plate such that the dielectric layer is enclosed within the first metal plate and the second metal plate, and

patterning said second metal plate to form an electrode overlying the dielectric layer and electrically isolated from the first metal plate, said electrode being spaced apart from the first metal plate by the dielectric to form a capacitor.

2. A method of claim 1 wherein the dielectric layer is composed of a photopolymer material.

3. A method of claim 1 wherein the second metal plate is deposited by a plating process.

4. A method of claim 1 further comprising  
coating the capacitor with a polymeric layer,  
forming a via in said polymeric layer communicating with the electrode,  
and  
depositing metal within the via to form an electrical connection to the  
electrode.

5. A method of forming a capacitor on a printed circuit board, the  
method comprising the steps of:  
providing a first metal plate on a dielectric substrate, said first metal plate  
having a first region and a second region about the first region,  
applying a photopolymeric film onto the first metal plate,  
patterning the photopolymeric film to define a dielectric layer overlying the  
first region of the first metal plate and to expose the second region of the first  
metal plate,  
plating a second metal plate onto the dielectric layer and the second  
region of the first metal plate such that the dielectric layer is enclosed within the  
first metal plate and the second metal plate,  
patterning said second metal plate to form an upper electrode overlying  
the dielectric layer and electrically isolated from the first metal plate and to  
concurrently pattern the second metal plate to form a lower electrode underlying  
the dielectric layer and cooperating with the upper electrode and the dielectric  
layer to form a capacitor,

applying a polymeric coating overlying the capacitor,  
defining a via in said polymeric coating communicating with said upper  
electrode, and  
depositing metal into the via to form an electrical connection to the upper  
electrode.

6. The method of claim 5 where the dielectric layer is between about 5 and  
50 microns thick.

7. The method of claim 5 wherein photopolymeric material is an epoxy  
based resin.

8. The method of claim 5 wherein the step of patterning the  
photopolymeric film comprises:

applying a photopolymeric film of a photosensitive polymer over said first  
metal plate, said photopolymeric film having a substantially uniform thickness,

selectively irradiating a first portion of said photopolymeric film overlying  
the first region of the first metal plate while avoiding irradiation of a remaining  
portion, said first portion being irradiated by actinic radiation effective to initiate  
polymerization of the photosensitive polymer, said portion being sized and  
shaped corresponding to the dielectric layer,

heating the photopolymeric layer to partially cure the first portion,

removing the remaining portion to expose the first metal plate about the partially cured, first portion, and

further heating the partially cured first portion to further cure the photosensitive polymeric material.

9. A method of claim 5 wherein the first metal plate and the second metal plate are formed of copper.

10. A printed circuit board having an integrally formed capacitor, said printed circuit board comprising

a dielectric substrate,

an lower electrode structure comprising a metal plate overlying the dielectric substrate and having a first region and a second region about the first region,

a dielectric layer overlying the first region of the first metal plate and having a perimeter surface,

an upper electrode overlying the dielectric layer,

wherein said lower electrode structure further comprises an extension disposed on the second region of said metal plate and about the dielectric layer, said extension comprising a lip overlying the perimeter surface thereof, said upper electrode being spaced apart from the lip by a trench.

11. The printed circuit board of claim 10 further comprising  
a polymeric layer overlying the capacitor and having a via communicating  
with the electrode, and  
a metal connection extending through the via to the electrode.

12. The printed circuit board of claim 10 wherein the upper electrode and  
the lower electrode are formed of copper.

a polymeric layer overlying the capacitor and having a via communicating  
with the electrode structure, and  
a metal connection extending through the via to the electrode structure.

13. The printed circuit board of claim 10 wherein the dielectric layer is  
composed of a photopolymeric material.

14. The printed circuit board of claim 13 wherein the photopolymeric  
material is an epoxy based resin.

15. The printed circuit board of claim 10 wherein the dielectric layer has a  
thickness between 5 and 50 microns.